

WHAT IS CLAIMED IS:

1. A method of refrigerant level monitoring in a refrigerant circuit of an air-conditioning or heat-pump system having a compressor and a refrigerant which may, depending on the operating point, be operated in the supercritical range, the method comprising:

at least in-operation level monitoring with the compressor switched on, measuring the refrigerant superheat ($dT_{\text{Ü}}$) at the evaporator of the system, and determining whether the measured superheat ($dT_{\text{Ü}}$) lies above a predetermined limiting value ($dT_{\text{ÜG}}$), as an indication of improper filling.

2. A method as claimed in claim 1, wherein, the refrigerant superheat ($dT_{\text{Ü}}$) at the evaporator is measured by using the difference between a refrigerant temperature (T_{KVA}) measured on the evaporator outlet side and a refrigerant temperature (T_{KVE}) measured on the evaporator inlet side, or by using the difference between a temperature (T_{LVA}), measured on the evaporator outlet side, of a medium led over the evaporator for the purpose of cooling the medium, and the refrigerant temperature (T_{KVE}) measured on the evaporator inlet side.

3. A method as claimed in claim 1, wherein the system comprises an air-conditioning system employing CO_2 as refrigerant.

4. A method as claimed in claim 3, wherein the air-conditioning system comprises an automotive air-conditioning system.

5. An apparatus for refrigerant level monitoring in a refrigerant circuit of an air-conditioning or heat-pump system having a compressor

and a refrigerant which may, depending on the operating point, be operated in the supercritical range, the apparatus comprising:

at least a system for in-operation level monitoring with the compressor switched on, comprising detectors for measuring the refrigerant superheat ($dT_{\text{Ü}}$) at the evaporator of the system, and a calculation circuit for determining whether the measured superheat ($dT_{\text{Ü}}$) lies above a predetermined limiting value ($dT_{\text{ÜG}}$), as an indication of improper filling.

6. An automotive vehicle, comprising an air-conditioner having a refrigerant circuit including a compressor and a refrigerant comprising CO_2 which may, depending on the operating point, be operated in the supercritical range, and a system for refrigerant level monitoring in the refrigerant circuit comprising an apparatus as defined by claim 5.